GOVT URDU SHOOL YELLAGONDAPALYA

Subject : Mathematics | **PRACTICE PAPER 2019 – 20** | **Code: 81 – E**

Time: 2.30 Hour | **MODEL PAPER** | **Marks: 80**

9TH STANDARD

1 x 8 = 8

1. Rationalising factor of $\frac{1}{\sqrt{5}+\sqrt{2}}$

A] $\sqrt{5}-\sqrt{2}$ B] $\sqrt{5}+\sqrt{2}$ C] $2\sqrt{5}-\sqrt{2}$ D] $\sqrt{5}-2\sqrt{2}$

2. Value of the polynomial $2x^2-4x+1$ at $x=0$

A] 1 B] 2 C] 3 D] 4

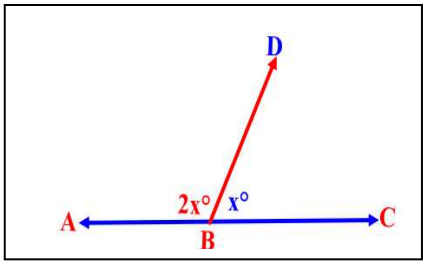
3.Express the $3x+2y+5$ linear equation in the $ax+by+c=0$

A] a = 3, b= 2, c = 5 B] a = 9, b=4, c = 5 C] a = 2, b= 3, c = 5 D] a = 3, b= 2, c = 1

4. If equals are added to equal, the wholes are equal.

A] Axiom – 2 B] Axiom – 3 C] Axiom – 4 D] Axiom – 5

5.The value of x is



A] 60° B] 70° C] 80° D] 90°

6. If three sides of one triangle are equal to the three sides of another triangle, then the two triangles Are congruent. This Rule is

A] SSS Rule B] SAS Rule C] ASA Rule D] RHS Rule

7. The value of the polynomial $2x^2+3x-4=0$ at $x=1$ is

A] 1 B] 2 C] 3 D] 4

8. A polynomial of one term is called a

A] binomial. B] monomial C] trinomial D] linear polynomial.

II. Answer the following

1 x 8 = 8

9. What is the meaning of CPCT?

10. The formula given by Heron about the area of a triangle is also known as Hero's formula and it Is stated as ?

11. Define a median of a triangle.

12. Angle in a semicircle is a----------

13. Write the formula for Curved surface area of a cylinder and Total surface area of a cylinder.

14. The mean of 10 , 7, 13, 20 , 15 is

15. Define empirical probabolity P(E) of an event E happening is given by

16. Write the formula of Volume of a Cone and Volume of a Sphere.

2 x 8 = 16

III. Answer the following :

17. Find five rational numbers between 3 and 4

18. Simplify: $(\sqrt{3}+\sqrt{7})^2$.

19. Simplify: $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}}$

20. Write any 3 Euclid's postulates.

21.Write any four type of Angles.

22. Write a pair of exterior angles and interior angles.

23. Divide p(x) by g(x), where $p(x) = x^3 - 3x^2 - 9x - 5$ and $g(x) = 1 + x$

24. Expandusing suitable identities : $(x + 2y + 3z)^2$.

25. E and F are respectively the mid – points of equal sides AB and AC of ΔABC Show that BF = CE.

26. Construct the perpendicular bisector of a given line segment 8cm.

27. Prove that : "If the diagonals of a quadrilateral bisect each othetr, then it is a parallelogram"

28. Find the area of a triangle, two sides of which are 8cm and 11cm and the perimeter is 32cm.

29. Show that $\sqrt{5}$ can be represented on the number line .

30. See fig and write the following:

(i) The coordinates of B and D

(ii) The coordinates of C and E

(iii) The point identified by the coordinates (– 4 – 4)

31. Prove that "The line drawn through the centre of a circle to bisect a chord is perpendicular to the chord"

32. In the figure

$\angle ABC = 69°$ $\angle ACB = 31°$, Find $\angle BDC$

33. find [i] The curved surface area and [ii] the total surface area of a hemisphere of radius 21cm.

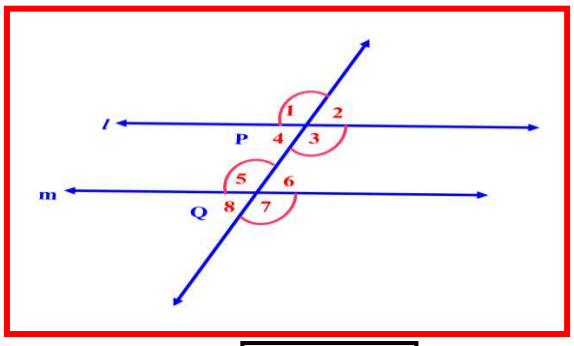
34. Draw the graph of $x + y = 6$

35. Prove that "Parallelograms on the same base and between the Same parallels are equal in area".

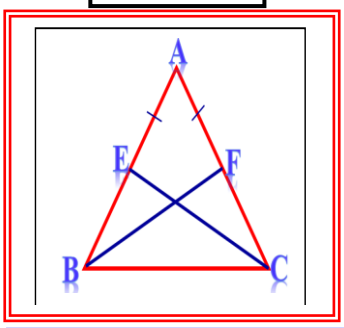
36. [a]A shot put is a solid sphere made of metal and its mass is equal to the product of its volume and Density, we need to find the volume of the sphere.

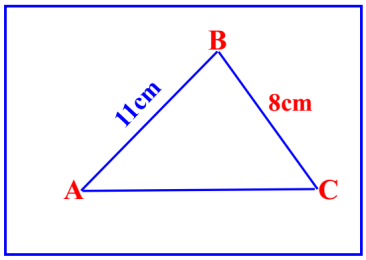
[b] A hemisphericl bowl has a radius of 3.5cm. What would be the volume of water it would contain.

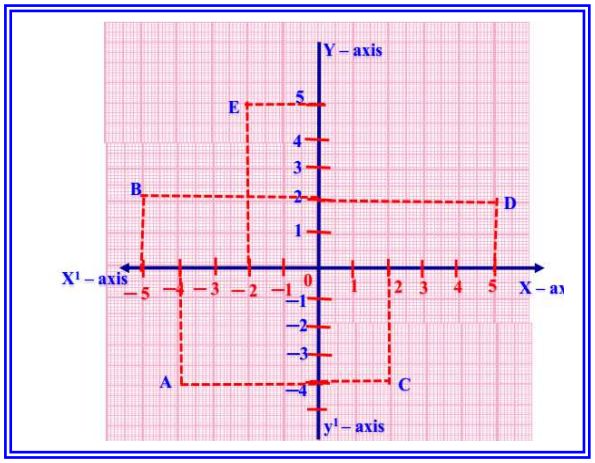
37. A family with a monthly income of Rs. 20,000 had planned the following expenditure per month

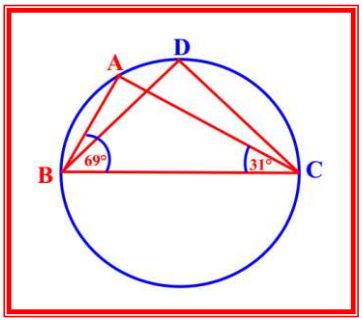


3 x 9 = 27









4 x 4 = 16

Under various heads:

Heads	Grocery	Rent	Education	Medicine	Fuel	Entertainment	Miscellaneous
Expenditure	4	5	5	2	2	1	1

Draw a bar chart for the above data

38. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is Represented in the following table.

1 x 5 = 5

Length	118 – 126	127 – 135	136 – 144	145 – 153	154 – 162	163 – 171	172 – 180
leaves	3	5	9	12	5	4	2

[a] Draw a Histogram to represent the given data[Hint : first make the class interval continuous]

[b] Is there any other suitable graphical representation for the same data

[c] is it correct to calculate that the maximum number of leaves 153mm long ? why ?

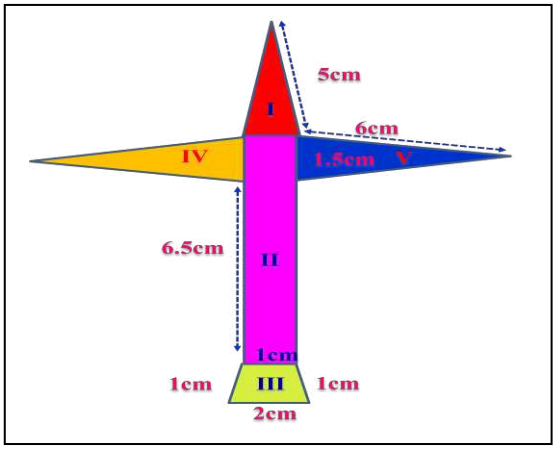
ACTIVITY – 20 MARKS

4 x 5 = 20

1. ***Construct a triangle ABC in which BC = 7cm, ∠B = 75º and AB + AC = 13cms .***

2.Radha made a picture of an aeroplane with coloured paper as shown in the fig.

Find the total area of the paper used.



3. Suppose you are given a circle.

Give a construction to find its centre.

4. Construct an angle of 45º at the initial point of a Given ray and justify the construction.

5. The taxi fare in a city is as follows: for the first kilometre, the fare us Rs.8 and fir the subsequent distranceIt is Rs. 5 per km. Taking the distance covered as x km and total fare as Rs y, write a linear equation for this Information, and draw its graph.

KEY ANSWERS:

1	2	3	4	5	6	7	8
A	A	A	A	A	A	A	A

9. What is the meaning of CPCT

Ans:- CPCT for corresponding parts of congruent triangles.

10. The formula given by Heron about the area of a triangle is also known as Hero's formula and it

Is stated as ?

Ans: Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

Where a, b, and c are the sides of the triangle, and S = semi – perimeter , i.e., half of the perimeter of

The triangle. $= \frac{a+b+c}{2}$

11. Define a median of a triangle.

Ans:- A median of a triangle divides it int two triangles of equal areas.

12. Angle in a semicircle is a

Ams:- right angle.

13. Write the formula for Curved surface area of a cylinder and Total surface area of a cylinder.

Ans:- $C.S.A. = 2\pi rh$ **and** $T.S.A. = 2\pi r[r + h]$

14. The mean of 10 , 7, 13, 20 , 15 is

Ans: Mean = $\frac{10+7+13+20+15}{5} = \frac{65}{5} = 13$

15. Define empirical probability P(E) of an event E happening is given by

Ans: - P(E) $= \frac{\text{Number of trials in which the event happened}}{\text{The total number of trials}}$

16. Write the formula of Volume of a Cone and Volume of a Sphere

Ans: Volume of a cone $= \frac{1}{3}\pi r^2 h$ **and Volume of a Sphere** $= \frac{4}{3}\pi r^3$

17. Find five rational numbers between 3 and 4

Ans: There are infinite rational numbers in between 3 and 4 can be represented as $\frac{24}{8}$ **and** $\frac{32}{8}$ **respectively.**

Six rational numbers between $\frac{25}{8}, \frac{26}{8}, \frac{27}{8}, \frac{28}{8}, \frac{29}{8}, \frac{30}{8}$

18. Simplify: $(\sqrt{3} + \sqrt{7})^2$.

Ans: use $(a+b)^2 = a^2 + b^2 + 2ab$

$$(\sqrt{3} + \sqrt{7})^2 = (\sqrt{3})^2 + (\sqrt{7})^2 + 2(\sqrt{3})(\sqrt{7})$$

$$= 3 + 7 + 2\sqrt{14}$$

$$= 10 + 2\sqrt{14}$$

19. Simplify: $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}}$

3 x 9 = 27

Solution: $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}} = 2^{\frac{2}{3}+\frac{1}{3}} = 2^{\frac{3}{3}} = 2^1 = 2$

20. Write any 3 Euclid's postulates.

Solution: Postulate 1. A straight line may be drawn from any one point to any other point,

Postulate 2 : A terminated line can be produced indefinitely.

Postulate 3 : A circle can be drawn with any centre and any radius.

Postulate 4 : All right angles are equal to one another.

21.Write any four type of Angles.

Solution : acute angle $x<90°$ [2] right angle $x = 90°$ [3] obtuse angle $x>90°$

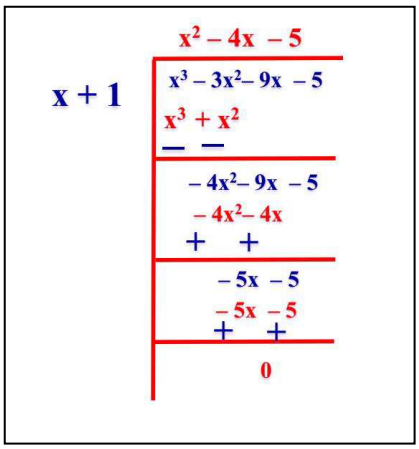
4] straight angle: $S = 180°$ 5] reflex angle$180° < t > 360°$

22. Write a pair of exterior angles and interior angles.

Solution: $\angle 1, \angle 2, \angle 7$ and $\angle 8$ are called exterior angles.

$\angle 3, \angle 4, \angle 5$ and $\angle 6$ are called interior angles.

23. Divide p(x) by g(x), where $p(x) = x^3 - 3x^2 - 9x - 5$ and $g(x) = 1 + x$
Solution: $p(x) = x^3 - 3x^2 - 9x - 5$ and $g(x) = x + 1$
Dividend = (Divisor x Quotient) + Remainder.



24. Expandusing suitable identities : $(x + 2y + 3z)^2$.

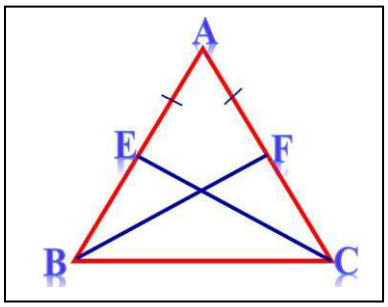
Solution: $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

$(x + 2y + 3z)^2. = (x)^2 + (2y)^2 + (3z)^2 + 2(x)(2y) + 2(2y)(3z) + 2(3z)(x)$

$= x^2 + 4y^2 + 9z^2 + 4xy + 12yz + 6zx$

25. E and F are respectively the mid – points of equal

sides AB and AC of ΔABC Show that BF = CE.



Solution: In Δ ABF and ΔACE

AB = AC [given]

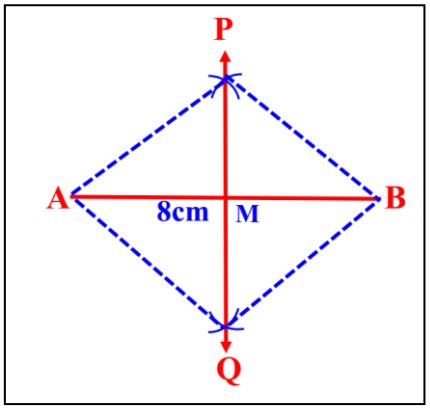
$\angle A = \angle A$ [common]

AF =AE [halves of equal sides]

Δ ABF $\cong \Delta ACE$ [SAS rule]

BF = CE [CPCT]

26. Construct the perpendicular bisector of a given line segment 8cm.

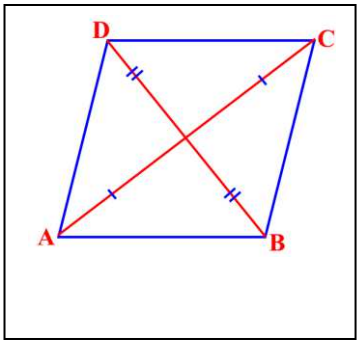


Solution :Taking A and B as centres and radius more than half
AB, draw arcs on both sides of the line segment
AB (to intersect each other)
2. Let these arcs intersect each other at P and Q
Join PQ.
3. Let PQ intersect AB at the point M. Then the
Line PMQ is the required perpendicular bisector of AB.

27. Prove that : "If the diagonals of a quadrilateral bisect each othetr,

then it is a parallelogram"

Solution: You can reason out this result as follows: note that in fig it 7.11



It is given that OA = OC and OB = OD,

So, Δ AOB ≅ Δ COD (why?)

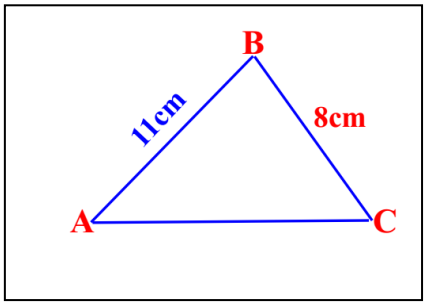
Therefore, ∠ ABO = ∠ CDO (why?)

From this, we get AB ‖ CD

Therefore ABCD is a parallelogram.

28. Find the area of a triangle, two sides of which are 8cm and 11cm and the perimeter is 32cm.

Solution:Here we have perimeter of the triangle 32cm, a = 8cm and b = 11cm



Third side c = 32cm – (8 + 11)cm = 13cm

So, 2s = 32 i.e., s = 16cm,

s – a = (16 – 8) cm = 8cm

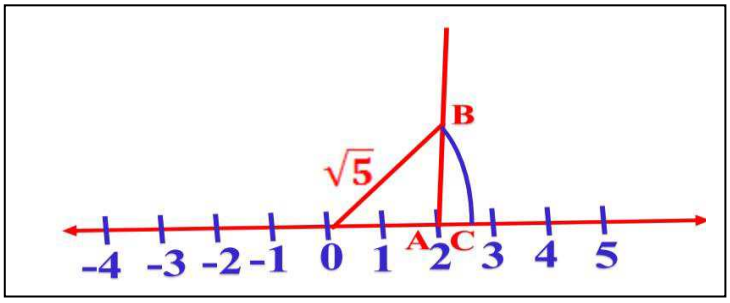
s – b = (16 – 11) cm = 5cm

s – c = (16 – 13) cm = 3cm

Therefore area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

=$\sqrt{16 \times 8 \times 5 \times 3}$ **cm2 = 8** $\sqrt{30}$ **= cm^2.**

29. Show that $\sqrt{5}$ **can be represented on the number line .**



Solutiob: we know that $\sqrt{4} = 2$

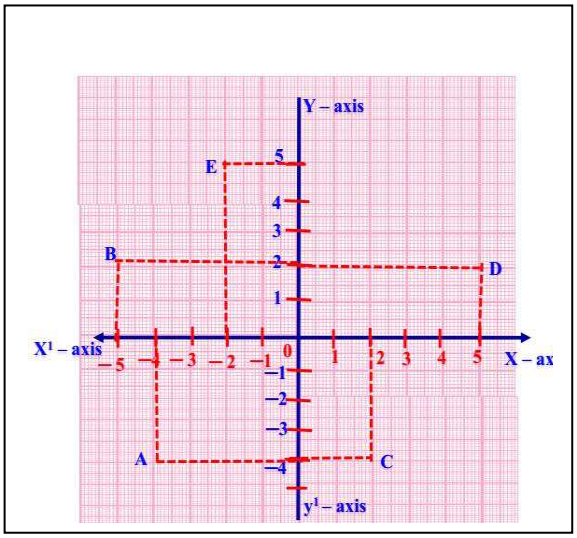
$\therefore \sqrt{5} = \sqrt{(2)^2 + (1)^2}$ **Draw a straight line**

And marks the values as indicated mark 'A' representing

2 on the number line . Now construct AB of unit length perpendicular to OA. Then taking O as the centre and

OB is the radius Draw an arc intersecting the number line at C.

30. See fig and write the following:



(i) The coordinates of B and D

(ii) The coordinates of C and E

(iii) The point identified by the coordinates (– 4 – 4)

Solution:(i) B= (– 5 , 2) D = (5 , 2)

(ii) C = (– 4 , 2) E = (– 2 , 5)

(iii) (– 4 – 4) = A

31. Prove that "The line drawn through the centre of a circle

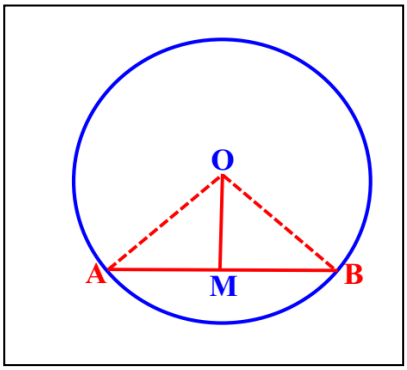
to bisect a chord is perpendicular to the chord"

Solution: Let AB be a chord of a circle with centre

O and O is joined to the mid-point M of AB. You have

to Prove that OM ⊥ AB. Join OA and OB see fig

In triangles OAM and OBM,



OA = OB

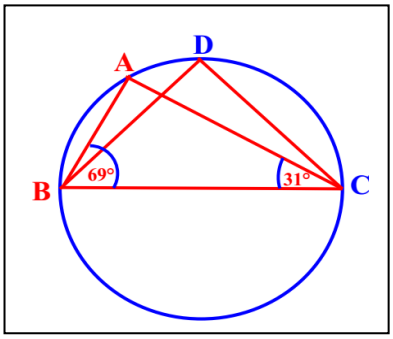
AM = BM

OM = OM [common]

Therefore, Δ OAM ≅ Δ OBM

This gives ∠OMA = ∠OMB = 90°'

32. In the figure ∠ ABC =69° ∠ACB = 31°, Find ∠BDC



Solution: In Δ ABC,

∠ BAC + ∠ ABC + ∠ ACB = 180°

∠ BAC + 69° + 31° = 180°

∠ BAC = 180° – 100° = 80°

∠ BAC = 80°

A and D are the points in the same segment of circle.

∠ BDC = ∠ BAC [angles subtended by the same arc at any points in the alternate segment of a circle are equal.]

∴ ∠ BDC = 80°

33. find [i] The curved surface area and [ii] the total surface area of a hemisphere of radius 21cm.

Solution: The curved surface area of a hemisphere of radius 21cm would be

$= 2\pi r^2 = 2 \times \frac{22}{7} \times 21 \times 21\ cm^2 = 2772\ cm^2$.

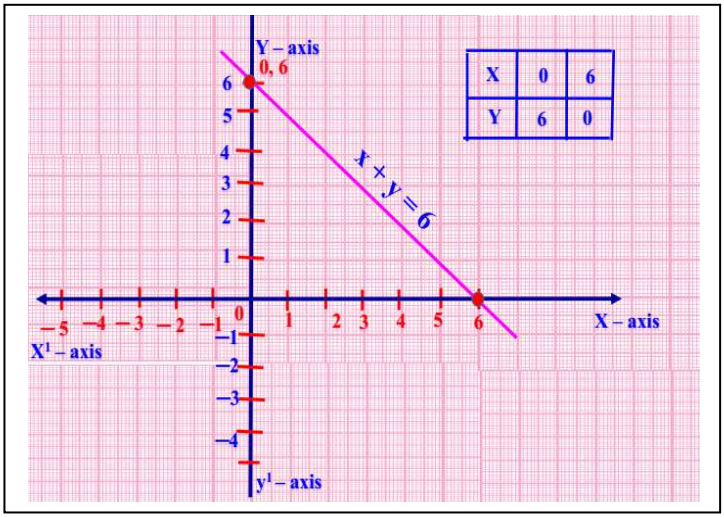
(ii) The total surface area of the hemisphere would be

4 x 4 = 16

$3\ \pi r^2 = 3 \times \frac{22}{7} \times 21 \times 21\ cm^2 = 4158\ cm^2$.

34. Draw the graph of x + y = 6

Solution : To draw the graph, we need at least two Solution of the equation. You can check that x = 0, And y = 6 and x = 6 , y = 0 are solutions of the given Equation. So we can use the following table to draw The graph.



35. Prove that "Parallelograms on the same base and between the Same parallels are equal in area".

Proof: Two parallelograms ABCD and EFCD, on the Same base DC and between the same parallels AF and DC are given we need to prove that ar (ABCD) = ar (EFCD)

In Δ ADE and Δ BCF,

∠ DAE = ∠ CBF [Corresponding angles from AD ‖ DC and transversal AF]---------[1]

∠ AED = ∠ BFC [Corresponding angles from ED ‖ FC and transversal AF]---------[2]

Therefore, ∠ ADE = ∠ BCF (Angle sum property of a triangle)----------[3]

AD = BC (Oppo site sides of the parallelogram ABCD)

So, Δ ADE ≅ ΔBCF [By ASA rule, using (1) (3)and (4)

Therefore, ar (ADE) = ar (BCF) (Congruent figures have equal areas) (5)

Now, ar(ABCD) = ar (ADE) + ar (EDCB)

= ar (BCF) + ar (EDCB)

= ar (EFCD)

So, parallelograms ABCD and EFCD are equal in area.

36. [a]A shot put is a solid sphere made of metal and its mass is equal to the product of its volume and [ex -19]

Density, we need to find the volume of the sphere.

[b] A hemisphericl bowl has a radius of 3.5cm. What would be the volume of water it would contain.

[a] Solution: Volume of the sphere = $\frac{4}{3}\pi r^3$

= $\frac{4}{3}$ x $\frac{22}{7}$ x 4.9 x 4.9 x 4.9 cm^3 = 493 cm^3. [nearly]

Further, mass of 1cm^3 of metal is 7.8 g.

Therefore, mass of the shot- putt= 7.8 x 493 g = 3845.44 g = 3.85 kg [nearly]

[b] The volume of water the bowl can contain=$\frac{2}{3}\pi r^3$

= $\frac{2}{3}$ x $\frac{22}{7}$ x 3.5 x 3.5 x 3.5 cm^3 = 89.8 cm^3.

37. A family with a monthly income of Rs. 20,000 had planned the following expenditure per month

Under various heads:

Heads	Grocery	Rent	Education	Medicine	Fuel	Entertainment	Miscellaneous
Expenditure	4	5	5	2	2	1	1

Draw a bar chart for the above data

Solution: We draw the bar graph of this data in the following steps. Note that the unit in the second column

Is thousand rupees. So '4' against 'Grocery' means Rs. 40000.

1.We represent the Heads (variable) on the horizontal axis choosing any scale, since width of the bar is not

Important. But for clarity, we take equal widths for all bars and maintain equal gaps in between. Let one Head

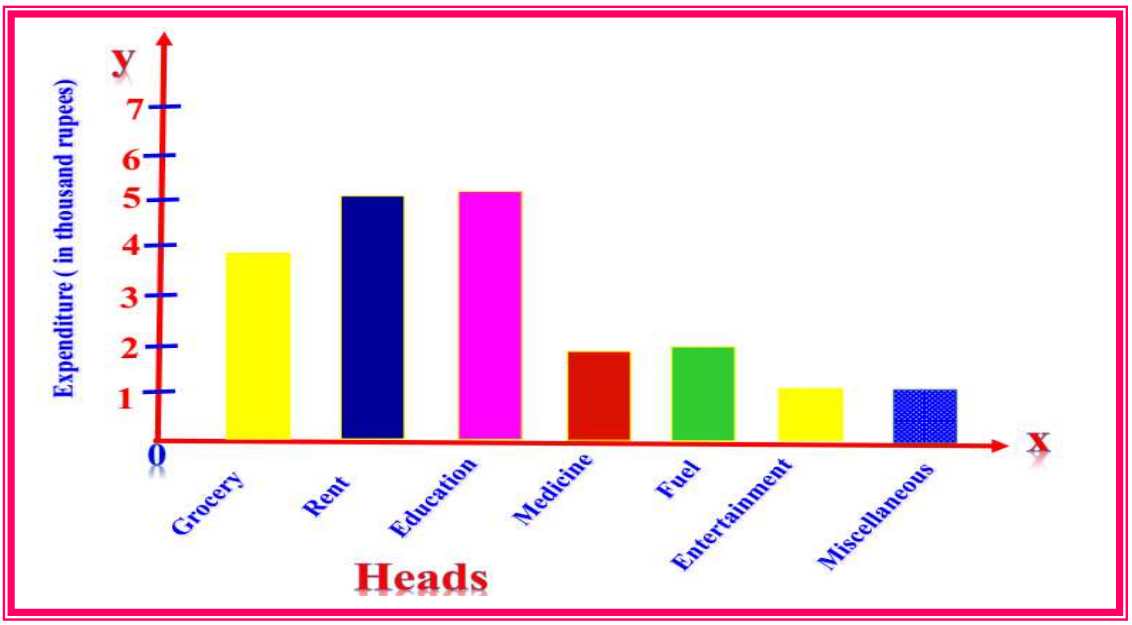
Represented by one unit.

2.We represent the expenditure (value) on the vertical axis. Since the maximum expenditure is ₹ 5000, we

Can choose the scale as 1 unit = ₹ 1000.

3. To present our first Head, ., grocery, we draw a rectangular bar with width 1 unit and height 4 units.

4. Similarly, other Heads are represented leaving a gap of 1 unit in between two consecutive bars.



5 x 1 = 5

38. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is

Represented in the following table.

Length	118 – 126	127 – 135	136 – 144	145 – 153	154 – 162	163 – 171	172 – 180
leaves	3	5	9	12	5	4	2

[a] Draw a Histogram to represent the given data[Hint : first make the class interval continuous]

[b] Is there any other suitable graphical representation for the same data

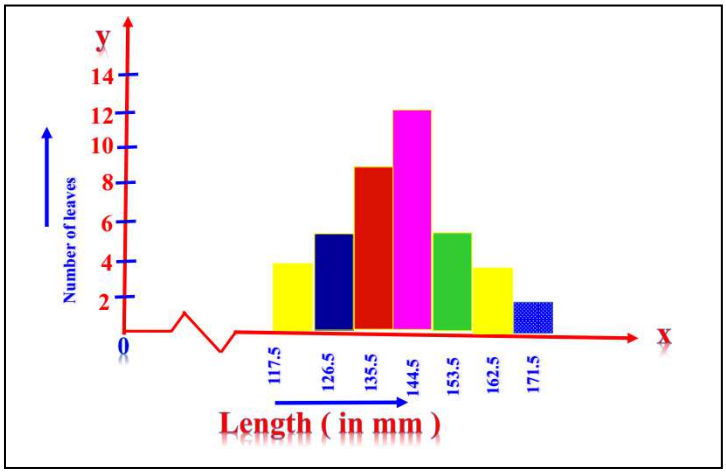
[c] is it correct to calculate that the maximum number of leaves 153mm long ? why ?

Solution: It can be observed that the length of leaves is represented in a discontinuous class interval having

A difference of 1 in between them. Therefore ½ = 0.5 has to be added to each upper class limit and also have to

Subtract 0.5 from the lower class limits so as to make the class interval continuous.

Length (in mm)	Number of leaves
117.5 – 126.5	3
126.5 – 135.5	5
135.5 – 144.5	9
144.5 – 153.5	12
153.5 – 162.5	5
162.5 – 171.5	4
171.5 – 180.5	2



Taking the length of leaves on x – axis and the number

Of leaves on y – axis, the histogram of this information

Can be drawn as above. Here, I unit on y – axis

Represents 2 leaves.

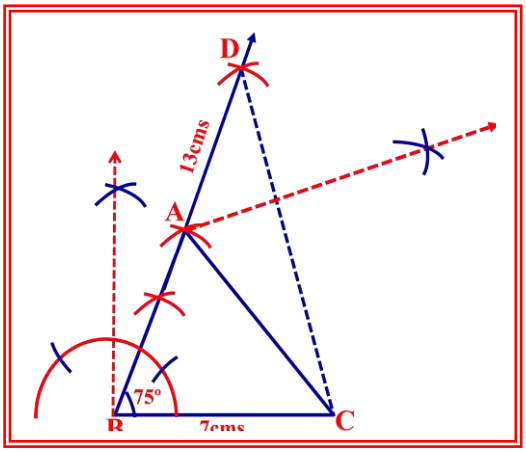
(ii) Other suitable graphical representation of this data is frequency polygon.

(iii) No , as maximum number of leaves (i.e., 12) has their length in between

144.5 mm and 153.5 mm. It is not necessary that all have their lengths as 153mm.

1. ***Construct a triangle ABC in which BC = 7cm, ∠B = 75º***

and AB + AC = 13cms .



Steps of construction:

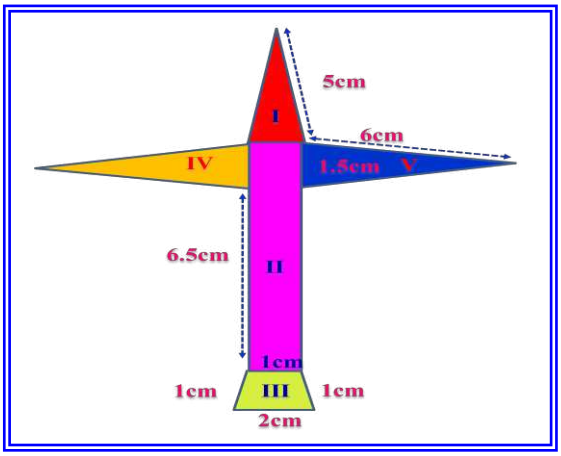
1. Draw a line segment BC = 7cm & construct ∠B = 75°

2. From BX cut off BD = 13cm and join CD.

3.Draw a perpendicular bisector of CD and let it intersect BD in A

4. Join AC. Thus ΔABC is the required tringle.

2.Radha made a picture of an aeroplane with coloured paper as shown in the fig.



Find the total area of the paper used.

Solution: In triangle I , this is an isosceles Δle.

Perimeter (2s) = 5 + 5 +1 =11cms

S = $\frac{11}{2}$ = 5.5cm Area of Δle =$\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{5.5\,(5.5-5)\,(5.5-5)\,(5.5-1)}$ =$\sqrt{5.5\,(0.5)\,(0.5)\,(4.5)}$

=$0.75\sqrt{11}$ cm^2. = 0.75 x 3.317 = 2.488 cm^2 (aprox)

In quadrilateral II: Area of rectangle = l x b = 6.5 x 1 = 6.5 cm^2.

In quadrilateral III it is Trapezium ;

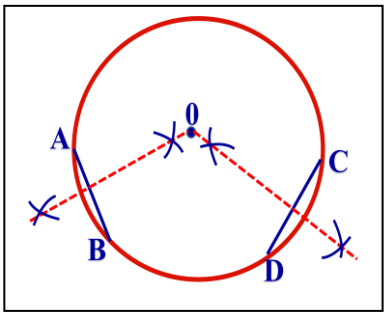
height of parallelogram =$\sqrt{1^2+(0.5)^2}$

= $\sqrt{0.75} = 0.86\ cm$

Area = Area of parallelogram + Area of equilateral triangle= (0.86) 1 + $\frac{\sqrt{3}}{4}$ $(1)^2$ = 0.86 + 0.43 = 1.29 cm^2.

Area of IV Δle = Area of Δle V = $\frac{1}{2}$ x 1.5 x 6 = 4.5 cm^2 .

Total area of paper used = 2.48 + 6.5 + 1.29 + 4.5 x 2 = 19.28cm^2 .



3. Suppose you are given a circle.

Give a construction to find its centre.

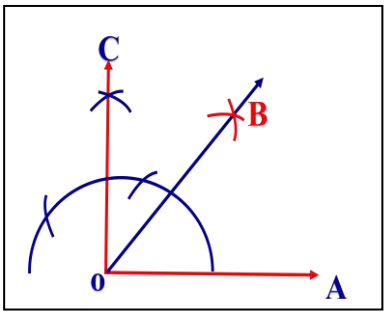
Step 1: Take the given circle.

Step 2: Take any two different chords AB and CD of this Circle and draw perpendicular bisectors of these chords.

Step 3: Let these perpendicular bisectors meet at point O

Hence, O is the centre of the given circle.

4. Construct an angle of 45° at the initial point of a Given ray and justify the construction.



5. The taxi fare in a city is as follows: for the first kilometre, the fare us Rs.8 and fir the subsequent distranceIt is Rs. 5 per km. Taking the distance covered as x km and total fare as Rs y, write a linear equation for this

Soliution: Given , Total distance covered = 'x' kms and total fare = y

Since the fare for first kilometre is Rs. 8 and fare for the remaining distance (x – 1) km is Rs.5 per km it Can be written in the form of a linear equartion in two variable 8 + 5(x – 1) = y

Now the equation becomes

Y = 8 + 5x – 5 or y = 3 + 5x ----------[1]

Let y = 0 , y = 3 + 5(0) = 3

Let x = 1 , ⇒ y = 3 + 5 (1) = 8

Let x = - 1 , y = 3 + 5 (- 1) = - 2

x	0	1	−1
y	3	8	−2